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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,201	03/31/2004	Jhon Jhy Liaw	N1280-00180(TSMC2003-1083	9501

54657 7590 01/25/2006

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EXAMINER

FENTY, JESSE A

ART UNIT PAPER NUMBER

2815

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/815,201

Applicant(s)

LIAW, JHON JHY

Examiner

Jesse A. Fenty

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 26-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 and 8-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al. (U.S. Patent No. 5,187,114) in view of Chan et al. (U.S. Patent No. 5,795,800) and further in view of Matsumoto et al. (US 2003/0153136 A1).

In re claim 1, Chan ('114, Fig. 6) discloses a semiconductor device, comprising:

- a first semiconductor device (18) formed on a semiconductor substrate;
- a non-conducting gate interconnect layer (30) formed on the semiconductor substrate for connecting to a gate of a second semiconductor device; and
- a silicide layer (36) formed on the gate interconnect layer, and an active region of the first semiconductor device for making a connection thereof, wherein the silicide layer is a sidewall butted connection structure that bridges a dielectric edge portion (12) separating the gate interconnect structure from the active region.

Chan ('114) does not expressly disclose an insulating substrate. Insulating (SOI) substrates are well known in the art as demonstrated by Chan ('800) and Matsumoto. It would have been obvious for one skilled in the art at the time of the invention to use an SOI underlayer/substrate as disclosed by Chan ('800) or Matsumoto for the device of

Chan ('114) for the purpose, for example, of minimizing transistor leakage and implantation-induced defects (Chan; column 3, lines 36-41).

In re claim 2, Chan ('114) in view of Chan ('800) discloses the device of claim 1, wherein the silicide layer is a continuous layer including a junction covering the dielectric edge portion and consisting of a first silicide film that includes silicon from said gate interconnect layer and a second silicide film that includes silicon from the active region.

Note that the silicide layer (36) disclosed by Chan ('114) can be seen as two separate silicide films. The first portion is the portion on the active region. The second portion is that that stretches up and over the gate interconnect layer.

In re claim 3, Chan ('114) in view of Chan ('800) discloses the device of claim 1, wherein the silicide layer further covers a sidewall of the gate interconnect.

In re claim 4, Chan ('114) in view of Chan ('800) discloses the device of claim 1, wherein the silicon substrate has a thickness of more than 20 angstroms.

In re claim 5, Chan ('114) in view of Chan ('800) discloses the device of claim 1, wherein the active region serves as a local interconnection layer between the first and second semiconductor devices.

In re claim 8, Chan ('114) discloses an SRAM cell comprising:

at least one active region with a silicide layer formed thereon serving as an intra-cell connection layer connecting drain nodes of at least a PMOS transistor and an NMOS transistor, the two transistors forming a first inverter (column 1, lines 30-32); and

a sidewall butted connection structure used in conjunction with a gate interconnect layer for connecting the drain nodes of the transistors of the first inverter to gates of at least two transistors forming a first inverter.

Chan ('114) does not expressly disclose an insulating substrate. Insulating (SOI) substrates are well known in the art as demonstrated by Chan ('800) and Matsumoto. It would have been obvious for one skilled in the art at the time of the invention to use an SOI underlayer/substrate as disclosed by Chan ('800) or Matsumoto for the device of Chan ('114) for the purpose, for example, of minimizing transistor leakage and implantation-induced defects (Chan, column 3, lines 36-41).

In re claims 15, Chan ('114) discloses an SRAM cell comprising:

at least one active region with a silicide layer formed thereon serving as an intra-cell connection layer connecting drain nodes of at least a PMOS transistor and an NMOS transistor, the two transistors forming a first inverter (column 1, lines 30-32); and

a sidewall butted connection structure used in conjunction with a gate interconnect layer for connecting the drain nodes of the transistors of the first inverter to gates of at least two transistors forming a first inverter.

Chan ('114) does not expressly disclose an insulating substrate. Insulating (SOI) substrates are well known in the art as demonstrated by Chan ('800). It would have been obvious for one skilled in the art at the time of the invention to use an SOI underlayer/substrate as disclosed by Chan ('800) for the device of Chan ('114) for the purpose, for example, of minimizing transistor leakage and implantation-induced defects (Chan, column 3, lines 36-41).

In re claims 9 and 22, Chan ('114) in view of Chan ('800) discloses the devices of claims 8 and 15 respectively, wherein the active region further connects to a source node of at least one pass gate (as shown in Figs. 1, 2).

In re claim 10, Chan ('114) in view of Chan ('800) discloses the device of claim 9, wherein the pass gate's drain node is connected to an access line (40, 46).

In re claims 11-14, 16, 18-20 and 23-25, Chan ('114) in view of Chan ('800) discloses the devices of claims 8 and 15 respectively, wherein the device discloses the lines (40 and 46) extending externally from the substrate. The various labels to the external lines such as "power supply", "access" and "landing pads" simply describe intended uses for the lines and do not further limit the structure of the device. Terms that simply set forth the intended use, a property inherent in or a function, do not differentiate the claimed composition of these elements from those known to prior art.

In re claim 17, Chan ('114) in view of Chan ('800) discloses the device of claim 15, wherein the first metal layer is also used for forming a connection between the drain nodes (22) of the two transistors of the first or second inverter.

In re claim 21, Chan ('114) in view of Chan ('800) discloses the device of claim 15, further comprising at least one active region (22) with a silicide layer (36) formed thereon serving as an intra-cell connection layer connecting drain nodes of the transistors of the first inverter.

3. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan ('114)/Chan ('800) as applied to claim 1 above, and further in view of Chan (U.S. Patent No. 4,569,112).

In re claim 6, Chan ('114) in view of Chan ('800) discloses the device of claim 1, but does not expressly disclose the thickness of the silicide layer. Chan discloses the thickness of a connection silicide layer (50) to be in the range of 0.1 microns, about 1000 angstroms (Appendix I). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a thinner silicide layer since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Since Chan's disclosure was from at least twenty years ago, it would have been within the skill of one in the art to use a thinner silicide layer because semiconductor devices and materials have been scaled down considerably since that time.

In re claim 7, Chan ('114) in view of Chan ('800) discloses the device of claim 1, but does not expressly disclose the resistivity of the silicide layer. Such resistivity is disclosed in the prior art by Chan ('112), Appendix I, being at a level of 5 ohm/ea, within the claimed range.

### ***Response to Arguments***

1. Applicant's arguments filed 11/01/05 have been fully considered but they are not persuasive.

a. Applicant amends claims 1 and 8 to assert that the SOI substrate extends totally under the NMOS and PMOS regions. Although broadly interpreted, the previous prior art still reads on the claims, examiner has included a secondary reference to show that SOI substrates that extend totally under PMOS and NMOS devices of SRAM technology are well known in the art.

b. Applicant argues, likewise, that claim 15 asserts similar features, in that the NMOS and PMOS structures both are formed over the insulator substrate, and thus defeat the disclosed Chan/Chan rejection.

i. Examiner respectfully disagrees. The language of claim 15, interpreted broadly, does not place both the PMOS and NMOS transistors over the SOI region. On the contrary, the term in the preamble, "formed on" is taken to be analogous with "formed over" or "above." Without further limiting language, the combination of Chan/Chan still reads on claim 15.

ii. Secondly, the term, "insulator substrate" is not well defined in the art. As interpreted by the examiner, once Chan ('800) forms the buried oxide layer (120) within the substrate, that substrate becomes an "insulator substrate," and any devices formed above that layer, are duly "formed on" that substrate.



***Conclusion***

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

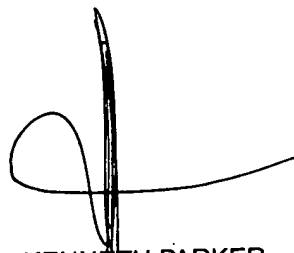
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 571-272-1729. The examiner can normally be reached on 5/4-9 1st Fri. Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jesse A. Fenty  
Examiner  
Art Unit 2815

A handwritten signature in black ink, appearing to read 'K. Parker', with a large loop on the left and a horizontal stroke extending to the right.

KENNETH PARKER  
SUPERVISORY PATENT EXAMINER